

Patent claims

1. A process for the preparation of a silica sol, wherein a fresh sol is reacted
5 with guanidine carbonate.
2. The process as claimed in claim 1, wherein the reaction with guanidine carbonate is carried out in the presence of a base.
- 10 3. The process as claimed in claim 2, wherein the base is sodium water glass, potassium water glass, potassium hydroxide and/or sodium hydroxide.
4. The process as claimed in any of claims 1 to 3, wherein the reaction is carried out at a pH of from 8 to 12, measured at the reaction temperature.
- 15 5. The process as claimed in any of claims 1 to 4, wherein the preparation of the silica sol is effected continuously.
6. The process as claimed in any of claims 1 to 5, wherein the fresh sol and an
20 aqueous solution of guanidine carbonate are fed continuously to a reactor, a pH of from 8 to 12 and a temperature of from 25°C to 100°C being established and the average residence time being chosen so that the silica sol prepared has a BET surface area of $\geq 100 \text{ m}^2/\text{g}$.
- 25 7. The process as claimed in claim 6, wherein the reaction is carried out at a temperature of from 80 to 100°C.
8. The process as claimed in either of claims 6 and 7, wherein an additional base is added to the reactor.

9. The process as claimed in any of claims 6 to 8, wherein the reactor is a multistage reactor cascade, the starting material preferably being fed to the first reactor.
- 5 10. The process as claimed in claim 9, wherein the pH, measured at the reaction temperature, is from 8 to 12 in all reactors and the temperature in the first reactor is kept at from 25°C to 100°C and that in the further reactors is kept at from 60°C to 100°C.
- 10 11. The process as claimed in any of claims 1 to 4, wherein the reaction is effected batchwise, at least a part of the fresh sol and the aqueous solution of guanidine carbonate being initially introduced into a reactor and the remainder of the fresh sol and of the aqueous solution of guanidine carbonate being metered into the reaction mixture, and the temperature being
15 established so that an amount of solvent which corresponds to the amount of metered remainder of the fresh sol and of the aqueous solution of guanidine carbonate evaporates.
- 20 12. The process as claimed in any of claims 1 to 11, wherein concentration by evaporation of the solvent or by ultrafiltration is effected during or after the reaction of fresh sol with guanidine carbonate.
13. A silica sol, obtainable by a process as claimed in any of claims 1 to 12.
- 25 14. A silica sol having a BET surface area of from 100 to 1200 m²/g, which contains from 0.05 to 15% by weight of guanidinium ions, based on the total weight of the silica sol.
- 30 15. The silica sol as claimed in claim 13 or 14, which has a BET surface area of from 300 to 1200 m²/g.
16. The silica sol as claimed in any of claims 13 to 15, which has a pH of from 2 to 12.

17. The silica sol as claimed in any of claims 13 to 16, which is not stabilized with aluminum and contains no amine.
- 5 18. The silica sol as claimed in any of claims 13 to 17, which has a molar SiO_2/N ratio of from 2 to 20.
19. The silica sol as claimed in any of claims 13 to 18, which has a zeta potential of from -20 to -80 mV.
- 10 20. The silica sol as claimed in any of claims 13 to 19, which has an IR band position of the Si-O stretching vibration at a wave number of from 1113 cm^{-1} to 1080 cm^{-1} .
- 15 21. The use of the silica sol as claimed in any of claims 13 to 20 in paper retention.